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TECHNICAL MEMORANDUM
Utah Coal Regulatory Program

October 14, 2009

TO: Internal File

THRU: Priscilla Burton, Team Lead PWB by SQS

FROM: James D. Smith, Environmental Scientist III JDS 10/19/09

SUBJECT: Permit Application - Coal Hollow Project, Alton Coal Development, Coal Hollow Mine, C/025/0005, Task ID # 3371

SUMMARY:

This is a new permit application. The application was first received 24 January, 2008. The Division determined the application to be Administratively Complete (letter dated 14 March, 2008). The Division sent a Deficiency Letter to the Applicant on 2 September, 2008 and received the Applicant's response on 22 December, 2008. The Division responded with another deficiency letter on 20 April, 2009, and the Permittee made a partial, informal response dated 15 June, 2009 and a final response dated 27 August, 2009.

The Application can be approved with the following conditions:

- Strike and dip are not evident on Drawings 6-1 and 6-6 (see statement in Section 622.300). Clearly indicate strike and dip on Drawings 6-1 and 6-6, or if strike and dip are shown on other maps, correct the reference in Section 622.30. R645 - 301- 622.300 requires strike and dip be shown on a map.

- The southern subirrigated area has been removed from Drawing 7-7: this is discussed in Appendix 7-7. Provide in the MRP a copy of the report or data that support its removal.

- Add Drawings 15 and 15B to the Table of Contents for Chapter 7.

- Add information on surface-water monitoring points SVWOBS-1 and SVWOBS-2 to Section 724.200 and appropriate maps.

- Identify the UPDES permit number and the locations of the UPDES permit discharge points.

- Clarify that silt fencing treating runoff from Watershed 6 will be placed on the upslope or east side of the relocated channel, rather than on the downslope or west side as indicated on Drawing 5-26.

- Update Section 731.600 Stream Buffer Zones to include "ephemeral streams that drain a watershed of at least one square mile". In response to a request from the Utah Mining Assoc., UAC R645-301-731.600 was reworded; the revision occurred after the Applicant's initial submittal and the submittal retains the older language. This is not a simple "housekeeping" exercise but rather has direct bearing in the Division's required Stream Buffer Zone finding.

- Clarify where A7-10 PLATE 1.pdf, A7-10 PLATE 2.pdf, DWG. PLATE 1.pdf, and DWG. PLATE 2.pdf are to be located in the MRP and their purpose. These plates were included in the 08/27/2009 submittal. Only Plate 1 is listed on the C2 form, which indicates Plate 1 is part of Appendix 7-7. The other 3 plates are not on the C2 form. All 4 appear to be part of Appendices 7-9 or 7-10. Appendix 7-10 lists "Sheet A7-10 Plate 2" in its REFERENCES, but A7-10 Plate 1 does not appear to be mentioned anywhere in the MRP.

TECHNICAL ANALYSIS:

GENERAL CONTENTS

MAPS AND PLANS

Regulatory Reference: 30 CFR 777.14; R645-301-140.

Analysis:

An unnumbered drawing included with the December 2008 submittal shows the Applicant's estimation of the extent of the adjacent area. The Division is not, at this time, accepting or rejecting this as a definitive Adjacent Area designation.

Findings:

The Division is not, at this time, accepting or rejecting the Applicant's un-numbered drawing that designates adjacent area. The Division will evaluate the Applicant's adjacent area

map and PHC determination in the context of the Cumulative Hydrologic Consequences (CHIA) document.

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

ALLUVIAL VALLEY FLOORS

Regulatory Reference: 30 CFR 785.19; 30 CFR 822; R645-302-320.

Analysis:

Alluvial Valley Floor Determination

Sink Valley Wash

The Applicant has made a request for determination of alluvial valley floor for the proposed Coal Hollow Mine and Sink Valley Wash area. Appendix 7-7 contains Alluvial Valley Floor Supplemental Information, which was added to specifically address several questions raised by the Division during the Administrative Completeness review. The following summarizes the conclusions of Appendix 7-7.

1. Coalesced alluvial fans form the surface of Sink Valley Wash.
2. Although alluvial fans are stream laid, they lack flood plains and terraces typically associated with alluvial valley floors.
    a. Flood plains and terraces are characteristic of alluvial valley floors
    b. The Applicant has found no evidence of these features.
    c. The cross section across the fan is convex, not planar.
    d. There are no vestiges of former flood plains, i.e., terraces.
3. There is no continuous stream channel in Sink Valley Wash
    a. There is evidence for a continuous channel
        i. The USGS Alton Topographic Quad shows a continuous channel for Sink Valley Wash.
        ii. The water rights map, Drawing 7-7, indicates continuous point-to-point diversions along the length of the Sink Valley Wash channel.
    b. The Applicant's field investigation indicates the main Sink Valley Wash channel is not continuous.

c. The Applicant's study of aerial photos indicates numerous discontinuous channel sections along Sink Valley Wash, but no continuous channel
    i. This is due to deposition across the channel-way by mud flows, sheet floods, and debris flow
    ii. Human activity may have created some of the discontinuity.
d. Adjacent to Sink Valley Wash, Kanab Creek and its tributaries are downcutting.
    i. Robinson Creek is the only continuous channel in the Sink Valley Wash area
    ii. Robinson Creek is deeply incised and appears to be actively downcutting.
e. The Applicant observed sheet flow from snowmelt in March of 2006
    i. Waters in the fields upstream of SW-6 were not flowing through any discernable stream drainage.
    ii. Surface flow was over a large area in an unconcentrated sheet flood.

4. Alluvial ground water is present.
    a. Water is both confined and unconfined
    b. There is no single, simple mappable water table or potentiometric surface, so cross sections and maps are not extrapolated over any distance.
5. Two small areas of subirrigated pasture are identified as Alluvial Groundwater Discharge Areas A and B on Drawing 7-7
    a. Both of these regions are located east of the north-south trending fault and Tropic Shale bedrock ridge that bisects the Coal Hollow Project area into eastern and western regions.
        i. Water quality in the northern subirrigation Area A is suitable for certain irrigation uses.
            1. Salinity hazard is medium to high with low sodium danger.
            2. It is suitable for irrigation of all or most plants, including boron-sensitive species.
                a. Special management for salinity control and drainage may be required.
                b. Plants with good salt tolerance should be selected.
        ii. Water quality in the southern Area B indicates high to very high salinity hazard with a low sodium danger.
            1. The water is suitable for all salinity- and boron-tolerant species and many semi-tolerant species.
            2. Good drainage and salinity control may be required.
        iii. TDS is generally high in alluvial waters west of these subirrigated areas.
    b. Water quality in the seeps in the southern end of Sink Valley Wash, near the southern subirrigation area, indicate ground water potentially available for subirrigation is of poor quality, high-salinity waters not typically useful for crop irrigation (Drawing 7-5).
    c. The Applicant noted no specific correlation between seasonal variations of water levels and vegetation changes.

d. Other potential subirrigated areas are on Drawing 3-1.
e. Root size and density and soil mottling were used to evaluate subirrigation potential for the various plant communities.
    i. Only the meadow and dry meadow plant communities were found to exhibit characteristics of sub-irrigation in the major soil types.
    ii. Pasture land has the potential for subirrigation.
    iii. Soil map unit 7 (Drawing 2-1) has characteristics of subirrigation; units 6 and 13 have localized potential for subirrigation, depending on soil type.

6. Historic flood irrigated and subirrigated lands are shown on Drawing 7-7
    a. The Pugh and Swapp Ranch homesteads used flood irrigation in the past.
    b. Darlynn Sorensen currently uses flood irrigation for hay or grain production on his property at the south end of Sink Hollow Wash (Chapter 4, Exhibit 4-1).
        i. Irrigation typically was a single application in the spring, when adequate water was available.
        ii. With the exception of 2005, water has not been sufficient for flood irrigation in recent years.
        iii. Without irrigation, there is still a crop but yield is lower.
    c. There is not now and has never been a reliable source of water for flood irrigation.
    d. Ponds are used for stockwatering and were used in the irrigation systems in the past.
        i. There are no operable conveyance systems between the ponds.
        ii. Drawing 7-7 shows the unlined earthen ditches used in the past to connect the ponds.
    e. Pasture lands in Sink Hollow Wash rely on precipitation (average approximately 16 in/yr) and not irrigation or subirrigation.
7. Swapp Hollow Creek has the best potential to support flood irrigation.
    a. Average instantaneous discharge measured is 55 gpm.
        i. There is considerable seasonal and climatic variability.
        ii. Calculated annual yield is 88.7 acre-feet, which would irrigate approximately 24 acres of alfalfa.
    b. Swap Hollow water is medium salinity, with low sodium hazard, suitable for most plants
8. Lower Robinson Creek, Dry Canyon, Section 21 drainage, Upper Water Canyon spring diversion, Sink Valley Wash, and alluvial ground water discharges have less potential to support flood irrigation.
    a. Flow volumes are low and inconsistent
    b. Water Canyon spring has good quality; water quality of the other potential sources is not discussed, mainly because analyses are sparse due to no-flow conditions.

The Division has also observed that the channel shown on the USGS Alton Topographic Quad and evident on the ground is a feature superimposed on the alluvial fan. It has not created

a floodplain; it originates near the head of the fan, where sheetwash collects into rills and channels, and is augmented by flow from Swapp Hollow and several smaller drainages.

J. C. Schmidt (*1980. Reconnaissance Determination of Alluvial Valley Floor Status and Assessment of Selected Geomorphic Parameters in Selected Stream Valleys of the Alton Petition Area and Adjoining Lands, Garfield and Kane counties, Utah. Report prepared for Office of Surface Mining)* made a reconnaissance determination

> "...intended to distinguish those areas clearly not alluvial valley floors and those areas where detailed study might show that the areas would be formally designated as alluvial valley floor. Reconnaissance identification is thus intended to highlight those areas where detailed study is necessary." (p. 43).

Schmidt based his determination on aerial photos, USGS reports, USDA farm maps, conversations with farmers and US Soil Conservation Service, water rights filings, and field reconnaissance. Schmidt incorporated these findings into OSM's draft "Alluvial Valley Floor Identification and Study Guidelines", in particular into Appendix D, which is specific to the Alton area. UDOGM made a determination in its 1988 Initial Completeness Determination that the Sink Valley Wash was an Alluvial Valley Floor (AVF) based not only on Schmidt's reconnaissance and generalized statements but also on the Division's geologic analysis – the Division's analysis is not available, only the summary in the findings document.

Water & Engineering Technology, Inc (WET, Appendix 7-4) and Petersen Hydrologic (Appendices 7-1 and 7-7) have done more detailed studies of Sink Valley Wash and have determined it is not an AVF. These reports find that although Sink Valley Wash is an alluvial deposit, it is an alluvial fan and lacks a floodplain and terrace complex necessary for an AVF. Also, the channel is not continuous: there was some question that the discontinuity of the channels was the result of human activities, but WET discusses evidence that the channel interruptions are natural, the result of deposition of colluvial and alluvial sediments from adjacent slopes and tributary drainages.

On October 1 and 2, 2008, Division personnel examined the area for AVF characteristics. They determined that upper Sink Valley Wash, where the mine is proposed, consists of alluvial fan deposits, with no floodplain and terrace complex. Although some characteristics for an AVF are present (see definitions for both "Alluvial Valley Floor" and "Upland Areas" in R645-100-200), i.e., unconsolidated stream-laid deposits and agricultural activity supported by irrigation and subirrigation, not all characteristics listed in the definitions in the Coal Mining Rules are clearly present, i.e., stream-laid deposits holding streams with water availability sufficient for irrigation or subirrigation agricultural activities: there is water available for subirrigation and irrigation, but the "stream" through Sink Valley is not the source of the water. Furthermore, the sedimentary structure of Sink Valley consists of colluvium and alluvial fans deposited by unconcentrated runoff, and there is no floodplain and terrace complex.

Drawing 7-7 identifies flood irrigated and subirrigated lands, ditches that have been used for irrigation, and ponds that were probably part of irrigation systems. In Sections 721 and 728.334, the Applicant states that there has been no irrigation during the past 10 years; this is based on personal communications from C. Burton Pugh in 2008 and Richard Dame in 2007 (Section 721; see also Chapter 1, Exhibits 1 and 2). The Pugh and Dame families own both the coal that will be mined and the overlying surface (Drawings 1-3 and 1-4).

During visits to Sink Valley Wash on 1–2 October 2008, 5-7 September 2006, and at other times, Division personnel have seen no evidence of current or recent flood irrigation in Sink Valley Wash, except for some domestic yard irrigation at the Swapp Ranch house (spring SP-8), owned by Mr. Dame.

During the September 2006 on-site visit, Mr. Pugh told Division personnel that his family had used irrigation for two small orchards on their property just west of the Swapp Ranch. Mr. Pugh's father won a prize for the highest yield of potatoes per acre (825 bushels) in 1917 by irrigating a one-acre plot, but from the affidavits from C. Burton and Roger Pugh in Chapter 1, Exhibits 1 and 2, it appears potatoes were not a regular crop. The Pughs dry farmed oats and wheat with limited success in the 1950's. Flood irrigation was used for a small vegetable garden, and when sufficient water was available, approximately 5 acres of pasture was flood irrigated. The Pughs used ditches, ponds, and pipes to irrigate, bringing water from as far as upper Robinson Creek: Drawing 7-7 shows locations for some of these structures.

In light of the finding the Division must make based on R645-302-321.300, it is clear from the geology and hydrology that upper Sink Valley Wash is not an AVF.

1. The surface in upper Sink Valley Wash consists of colluvium and unconsolidated steam-laid deposits of coalesced alluvial fans.
2. There are neither flood plains nor terraces.
3. Surface drainage channels are not continuous.
4. Topography is compatible for flood irrigation, but there is currently no flood irrigation in the area.
    a. There has been limited flood irrigation in the past.
        i. Water is not consistently available for flood irrigation
        ii. Most water quality is marginal to satisfactory for flood irrigation.
    b. The change in land use (cessation of irrigation) was neither affected by nor precluded in any way by the proposed mine or the Applicant.
5. Using salinity control and appropriate plant selection, the ground-water systems have the potential to support subirrigation in two small areas.

Kanab Creek and Lower Sink Valley Wash

The Applicant identified Probable AVFs along Kanab Creek, west of the proposed mine (Sections 24, 25, 26, 35, and 36, T. 39 S., R. 6 W.), and along lower Sink Valley Wash (Sections 5 and 6, T. 40 S., R. 5W.), south of the County Road 136 crossing (Plate 5). The Applicant has provided information and discussion for these areas in Appendix 7-7.

Kanab Creek

The area along Kanab Creek has unconsolidated stream-laid deposits that hold a stream. It has a floodplain and terraces, and is not an upland area. This is improved grazing land that is irrigated when sufficient water is available from Kanab Creek: in the past, alfalfa and grass hay were raised when more water was available; the probable cause in the diminished flows is a decrease in flood irrigation return flows from upstream users (Appendix 7-7). The Division has determined that this is an AVF.

The nearest point of the proposed permit boundary to this AVF lies approximately ¼ mile east of the AVF, and the nearest disturbance – the Excess Spoil Pile - will be approximately ¾ mile away. Water used for irrigation is diverted from Kanab Creek approximately ½ to ¾ mile upstream of the AVF (Chapter 7, Plate 5), well beyond influence from the mine. Appreciable discharge in the drainage occurs only during snowmelt and in direct response to torrential rainfall events.

There are no water rights or diversions on Lower Robinson Creek and Lower Robinson Creek does not supply water for irrigation of the AVF (Appendix 7-7). The Division has determined that the mine operation will not interrupt, discontinue, or preclude farming on the AVF on Kanab Creek.

Lower Sink Valley Wash

Beginning about a mile north of the County Road 136 crossing, Sink Valley begins to narrow significantly. South from the crossing the valley again widens and a relatively flat or gently sloping flood plain becomes apparent on the bench adjacent to the deeply incised (>20 feet) lower Sink Valley Wash. Stream-laid deposits are evident in the deeply eroded stream banks. Similar features extend farther downstream, beyond the area delineated in Plate 5, but these have not been included in either the Applicant or the Division's evaluations.

Grasses and sagebrush dominate the vegetation. The range has been marginally improved with fencing and appears to have been used for livestock grazing, although there is no evidence of current use. Neither the Applicant nor the Division has observed evidence of flood irrigation or crop production.

Based on topography, the area appears capable of flood irrigation; however, the absence of a reliable source of water limits the potential for agricultural activity based on either flood irrigation or subirrigation. At surface-water monitoring site SW-9 in this probable AVF area, water was present at only 2 of the quarterly observations between June 2005 and May 2009: 10.6 gpm on March 2006 and 182 gpm on March 2008. The depth of the incised channel further hinders both flood irrigation and subirrigation (see OSM's draft "Alluvial Valley Floor Identification and Study Guidelines", p. D-4).

Drawing 7-13 (MRP Chapter 7) shows the potentiometric surface is close to ground level north of the county road crossing, at wells SS, LS, and Y-63. Where the valley narrows and the burned or eroded coal zone (observed in well SS-75) intersects the ground surface, groundwater discharges as seeps, springs, or diffuse seepage to the surface. It is likely that little groundwater remains to flow south to support subirrigation in the lower Sink Valley Wash probable AVF.

Findings:

Information in the submittal is sufficient for the Division to determine that:

1) there is no AVF in Sink Valley in and adjacent to the proposed Coal Hollow Mine;
2) the AVF in Kanab Creek will not be affected by the mine; and
3) the area south of the proposed Coal Hollow Mine, identified by the Applicant as the lower Sink Valley Wash probable AVF , has no potential for irrigation or subirrigation and is not an AVF.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Analysis:

Baseline Information

The 20 April, 2009 deficiency letter included the following:

> ***R645-301-624, -724,*** *The Applicant needs to show the extent and depth of the proposed pits on the geologic cross sections of Drawings 6-3, 6-7, and 6-8. Also, to more clearly convey the importance of the Sink Valley Fault and associated Tropic Shale ridge in the relationship of the hydrologic systems to the proposed mine, the Applicant needs to show the Sink Valley Fault on several other maps and cross sections, including but not limited to: Drawings 7-1, 7-4, 7-7, 7-12, 5-10, 5-17, 5-18, and 5-19. As an alternative, the Applicant could create new maps and cross sections that clearly show the extent of the pits – including the extent of overburden removal (Drawing 5-16); the location of the fault and Tropic Shale Ridge (Drawing 7-12); the location of*

seeps and springs (Drawing 7-1); the potentiometric surface (Figure 13 and Drawing 7-13); the Alluvial Discharge Areas (Drawing 7-4); and – if known - location, extent, thickness or top-elevation of the saturated zone(s) of the alluvial aquifer. Such maps and cross section don't need to cover the entire permit area; larger scale maps and cross sections, centered on Pit 15 where the possibility of impacting the hydrologic balance and the essential hydrologic function of what is possibly an AVF is greatest, would be preferable. Cross sections should be approximately 1000 feet apart and must extend beyond the Permit Boundary far enough to show the relationship of the proposed mining to hydrology of the adjacent area; at least one should extend east far enough to include the Sink Valley Wash channel. [JS]

In response, the Applicant submitted Drawings 7-15 and 7-15B and Plates 1 and 2. Drawing 7-15B is a series of five east-west cross sections, approximately 1000 feet apart; the locations are on Drawing 7-15 and Plate 1. The cross sections extend beyond the Permit Boundary to the Sink Valley Wash channel and show the relationship of the proposed mining to the hydrology of the adjacent area. They show the extent of the pits and overburden removal, the location of the Sink Valley Fault and Tropic Shale Ridge, and the general extent and thickness of the coarse sediments where groundwater flow is more likely. Drawing 7-15B also indicates the potentiometric surface, and Plate 2 depicts a Compacted Shale Barrier on cross section E-E'.

Seeps, springs, wells, and the Alluvial Discharge Areas are not shown on these maps and cross sections, but the Applicant has provided this information on other maps and cross sections. Although this information would make Drawings 7-15 and 7-15B and Plates 1 and 2 even more useful, the Applicant has provided sufficient information to meet the applicable requirements of the Utah Coal Mining Rules.

The 20 April, 2009 deficiency letter included the following:

R645-301-720 and -121.200, On page 18 of Appendix 7-7, the Applicant needs to clearly identify the Section and quarter-section where the trenches in T. 39 S., R. 5 W. were dug. "...Shallow alluvial groundwaters were sampled from trenches in the alluvial system in the eastern 1/4 of Section T39S, R5W in April 2006,.."

In response, the Applicant added the section number (30) to the trench location information. It is in section 5.2.2 Southern subirrigation area water quality.

Spring locations on Drawings 7-1, 7-2, and 7-10 that do not match those on Drawing 7-3. The Applicant must resolve this confusion.

Petersen Hydrologic conducted a spring and seep survey in 2005 and 2006. UTM coordinates and field parameters for identified sites are listed in Appendix B of Appendix 7-1. Locations are plotted on a USGS topographic map in that same appendix. The area covered by the primary seep and spring survey is identified on Drawing 7-1

The 20 April, 2009 deficiency letter included the following:

> ***R645-301-722.300,*** *The Applicant needs to clarify the difference between the wells shown on Drawing 7-2 and those on Drawing 7-12. It still isn't clear why the wells on Drawing 7-12 and on Figure 12 of Appendix 7-1 are not included in the baseline monitoring points shown on Drawing 7-2. Drawing 7-2 shows spring, stream, and well baseline monitoring location; however, Drawing 7-12 shows additional wells used to gather baseline data, and most of them were installed by the Applicant for this permit application.*
>
> *"722.300 Baseline monitoring stations*
> *Baseline monitoring stations are shown on Drawing 7- 2. A map showing the locations of monitoring wells in the proposed Coal Hollow permit and adjacent area is presented in Drawing 7-12 and on Figure 12 of Appendix 7-1. Drawings 7-2 and 7-12 also show monitoring stations from which baseline hydrologic data were collected in previous studies. Monitoring station locations, elevations, and other details are presented in Table 7-1."*
> *"724.100 Groundwater Information*
> *"The location of wells and springs in the proposed Coal Hollow Mine permit and adjacent area are shown on Drawings 7-1 (Spring and seep survey map), 7-2 (Baseline monitoring locations), and 7-12 (Monitoring well location map)..."*

The Applicant responded by including additional baseline springs, wells, and stream monitoring points on Drawing 7-2. Drawing 7-10 shows the operational monitoring locations – streams, springs, and wells - that are listed in Table 7-5. Drawing 7-12 is described as showing the locations of monitoring wells in the proposed Coal Hollow permit and adjacent area, and it shows all the wells listed in Table 7-5 except for Y-98 because the drawing does not extend far enough to the northeast to include Y-98. Drawing 7-12 also includes four wells (C-6, C-8, 7-59, and Y-99) that were used in previous studies to collect baseline data on the alluvial groundwater system: data for these four wells are in the Division's database, but these wells are not included in the operational monitoring plan. Figure 12 of Appendix 7-1 also shows locations for monitoring wells, with the map symbols signifying whether the well monitors water in the coal seam or alluvium: Y-36, Y-38, and Y-45 are the coal seam wells the Applicant plans to monitor (Table 7-5). Coal-seam monitoring wells Y-39, Y-40, Y-41, Y-43, Y-49 and Y-53 and alluvium monitoring wells Y-50 and Y-62 are shown on Figure 12 but on no other map; no data for these wells have been submitted to the Division's database but potentiometric data from the 1980s are in Table 13 of Appendix 7-1.

The Applicant describes 13 surface-water baseline monitoring points in Section 724.200.

Kanab Creek drainage

- SW-1 Kanab Creek near Alton, Utah; above proposed mining areas,
- SW-2 Kanab Creek below Lower Robinson Creek and below proposed mining areas,
- SW-3 Kanab Creek above proposed mining areas, and
- Lamb Canal irrigation ditch west of the permit area, adjacent to Kanab Creek.

Lower Robinson Creek drainage

- SW-4 Robinson Creek above proposed mining areas),
- SW-5 Lower Robinson Creek below proposed mining areas,

- SW-101 Lower Robinson Creek near proposed mining areas, and
- BLM-1 (Lower Robinson Creek adjacent to proposed mining areas.

Sink Valley Wash drainage

- SW-6 headwaters of unnamed tributary to lower Sink Valley Wash,
- SW-7 unnamed drainage in Section 21, T39S, R5W,
- SW-8 Swapp Hollow above proposed mining areas,
- SW-9 Sink Valley Wash below proposed mining areas,
- SW-10 unnamed tributary to Sink Valley Wash and
- RID-1 irrigation diversion of water from Water Canyon drainage above proposed mining areas.

Erik Petersen notified the Division by e-mail on August 24, 2009 that two additional surface-water monitoring points were being added: SVWOBS-1 in the NW/4 of Section 21, T. 39 S., R. 5 W., where the northern fork of Sink Valley Wash crosses the two-track that accesses the drainage in the center of Section 21, and SVWOBS-2, located where Sink Valley Wash crosses the Swapp Hollow access road east of the Sorensen Ranch house. These have been added to the Division's database but not to maps, tables, or other locations in the MRP.

The Division received a comment that baseline water quality and quantity data were not sufficient, that one or more season's data were missing for some sites, and that data have not been collected for two years. The Division's Tech-004 is cited: Tech -004 is a guideline, not a rule, and is not enforceable. Tech-004 advises one year of baseline data, adequate to describe seasonal variation, before the submission of the application. The Applicant has met this standard.

The following table summarizes what is in the Division's electronic database for the 13 sites listed above, plus SW-I0, BLM-l, and Lamb Canal: Table 4 of Appendix 7-1 also contains discharge and basic water quality data for these sites (except BLM-1) and discharges for most are plotted in Figure 13 of Appendix 7-1. Although data are missing for some quarters at certain sites, the data are sufficient to determine seasonal variation in quality and quantity, and data collection is ongoing.

Several boreholes encountered water at depths of approximately 10 – 15 feet, and flowing sands were found at 15 to 25 feet. The subsurface investigation was done during a period of high snowmelt; seasonal fluctuations of water levels of several feet are not uncommon (Appendix 5-1, Section 4.3). Drill logs, by Petersen Hydraulic and Taylor Geo-Engineering, are in Appendix B of Appendix 5-1. Geotechnical data from the boreholes are in Appendices C-1 and C-2 of Appendix 5-1. Drilling and sample locations are shown on Drawing 5-39.

F - field parameters only; B - baseline parameters; NA – no access; NF - no flow														
Qtr.	**SW-1**	**SW-2**	**SW-3**	**SW-4**	**SW-5**	**SW-6**	**SW-7**	**SW-8**	**SW-9**	**SW-101**	**RID-1**	**Lambs Canal**	**BLM-1**	**SW-10**
1-87														
2-87		F												
3-87	F	F	F			F	F	F						F
4-87	F	F	F	F	F	F	F	F	F					F
1-88	F	F	F	F	F	F	F	F	F					F
1-89														F
2-05	B	B	B	B	B			B	NF	B				
2-05												F		NF
3-05	B	B	B		NF	NF		B	NF	NF		F		NF
4-05	B	B	B	NF			NF	B	NF	NF	B	NF		NF
1-06	B	NA	B			B			B	B		NA		NF
2-06	B	B	B	NF	B	NF		B	NF	NF	B	F		NF
3-06	B	B	B	NF	B	NF	NF	B	NF		B	NF		NF
4-06	B		B	NF	NF	NF	NF	B	NF	NF	B			NF
1-07	B	B	B	NF	NF	NF	NF	B	NF		B	F	F	NF
2-07				NF	NF	NF	NF		NF	NF		F	F	NF
3-07	B	B		NF		NF	NF	B	NF	NF	B	F	F	NF
4-07	B	NA	B	NF	NF	NF	NF	B	NF	NF	NF			NF
1-08		NA	B	NA	NA	B		NA	B	NF	NA		NA	F
2-08	B	B	B	NF	B	NF	NF	B	NF	NF	B	F		NF
3-08	B	B	B	NF	B	NF	NF	B	NF	NF	B	NF	F	NF
4-08	NA	NA	NA	NA	NA	NF	NA	NA	NF	NF	NA	NA	NA	NF
1-09		NA	B	NF	B	B	NF	B	NF	B	B	NF	F	NF
2-09	NA	B	B	NF	B	NF	NF	B	NF	NF	B	B	F	NF

The Applicant has identified that, in and adjacent to the proposed permit area, groundwater resources in the Tropic Shale and Dakota Formation are limited, and neither is a significant source of ground water. Information supporting this conclusion is found in Section 721. Chapter 6 and Appendix 7-1 contain information on the lithology and stratigraphy of the Tropic and Dakota strata. Bore-hole logs in Appendix 6-4 indicate strata overlying and immediately underlying the Smirl Coal do not possess aquifer characteristics.

In the proposed permit and adjacent area, Tropic Shale and Dakota Formation provide no baseflow to streams or water from wells. The Applicant has identified one small spring (SP-4;

average flow ~1 gpm) that flows from a fault zone in the Dakota and seeps SP-27 (also known as Clampett Spring) and SP-34 that flow from the Dakota Formation in the area just south of the proposed mine (Drawing 7-1). There are no wells in the proposed permit and adjacent area that produce water from the Tropic Shale or Dakota Formation. Mining of the Smirl Coal, at the Tropic – Dakota interface, is not expected to intercept significant volumes of water from these strata nor adversely impact any aquifer below the coal.

The Applicant states that the Dakota Formation is not a good aquifer. Vertical and horizontal ground-water flow in the Dakota Formation is impeded by the presence of low-permeability shales that encase the interbedded, lenticular sandstone strata in the formation, and the natural flow of ground water through the formation is meager, with only minor discharge from the Dakota to springs or streams in the surrounding area. The Tropic Shale that overlies the Dakota limits vertical recharge (Section 624.100; Groundwater).

Slug tests on wells screened in the Smirl Coal Seam indicate relatively low hydraulic conductivity values (Table 7-8). In much of the proposed mining area, the coal seam has been found to be dry. Neither large inflows of ground water from the coal seam into mine workings from the Dakota Formation nor seepage out of mine pits through the coal seam is expected.

The Division received a comment that the boreholes did not extend to the aquifers in the Dakota Formation. The commenter did not identify aquifers or present evidence of aquifers in the Dakota Formation. Neither the Division nor the Applicant has found evidence of aquifers in the strata beneath the Smirl Coal Seam that may be adversely impacted by mining. Borehole logs in Appendix 6-4 contain representative drill-hole logs depicting the nature, depth and thickness of the coal seam to be mined, rider seams in the overlying strata, and the nature of the Dakota Formation strata immediately below the coal seam to be mined, which meets the requirements of the Coal Mining Rules.

A comment was received that there is no description of the geology that includes any aquifer below the lowest coal seam to be mined, and that samples have not been collected from that aquifer. The Navajo Sandstone aquifer is a regional aquifer that provides ground water of good quality for domestic and agricultural use and to municipal wells. It provides baseflow to springs and streams, and it is the first water-bearing strata underlying the Smirl Coal Seam that can produce appreciable quantities of ground water. The Navajo Sandstone does not crop out in the proposed Coal Hollow Mine permit and adjacent area, is effectively isolated from proposed mining areas by more than 1,000 feet largely low-permeability shales and siltstones of Dakota and Carmel Formations, and is not reasonably expected to be impacted by proposed mining operations. The Navajo Sandstone is described in Sections 621, 624.100, 728.310.

The application contains geologic information in Chapter 6, Appendix 7-1, and other sections of the submittal. This information is sufficient to assist in determining the PHC of the proposed operation on surface and ground waters in the proposed permit and adjacent areas,

determining whether the required reclamation can be achieved, and whether the proposed operation has been designed to prevent material damage to the hydrologic balance in the adjacent area.

The Sink Valley Fault and associated Tropic Shale ridge are important features in the surface and subsurface hydrology of Sink Valley Wash. Figure 8 of Appendix 7-7 shows the relationship of the springs, ponds, and streams to the Tropic Shale Ridge and fault and the extent of surface disturbance from excavation of the mine pits. The cross-section on Drawing 7-6 shows the relationship of the pits to the Sink Valley Fault, the Tropic Shale ridge, and the alluvium. To more clearly convey the importance of the Sink Valley Fault and associated Tropic Shale ridge in the relationship of the hydrologic systems to the proposed mine, the Applicant has added Drawings 7-15 and 7-15B and A7-10 Plates 1 and 2, which show the extent of the pits – including the extent of overburden removal, the location of the fault and Tropic Shale Ridge and the location of the potentiometric surface and depict the approximate location, extent, thickness, and elevation of the saturated zone of the alluvial aquifer. The cross sections are approximately 1,000 feet apart and extend beyond the Permit Boundary far enough to show the relationship of the proposed mining to hydrology of the adjacent area.

The PHC determination does not indicate the need for supplemental baseline information as described in R645-301-724.500. However the Division will consider the need for supplemental information as mining proceeds.

Baseline Cumulative Impact Area Information

The Division has prepared the CHIA findings document. Information from the permit application was used along with information from other sources in preparing the CHIA. The Applicant may be required to provide additional information in conjunction with future mining.

Probable Hydrologic Consequences Determination

Section 728 contains the PHC Determination, and there is also discussion in Section 724.500. A comment was received that the PHC determination was not based on baseline geologic and hydrologic information "collected for the permit application". The Division finds that although the baseline data are not flawless, they are sufficient for the Applicant to complete the PHC determination. The following sections summarize the Applicant's PHC determination.

Potential Adverse Impacts to the Hydrologic Balance (728.310) The application states that information from drilling and aquifer tests indicates that large inflows to the mine pit are not expected; if such inflows develop as mining progresses, the Applicant commits to use techniques such as bentonite- or clay-filled cutoff walls to minimize inflows. Temporary reductions in flow

from alluvial aquifers may occur but are likely to be short-lived as the pits will remain open for only 60 to 120 days (Section 724.500).

Long-term impacts could occur to the alluvial groundwater system in Sink Valley from the draining of alluvial groundwater into the pit backfill area. To minimize this potential, a permanent, engineered low-permeability barrier will be emplaced adjacent to the undisturbed alluvial sediments along the eastern edge of the Pit 15 disturbance. Information and design details for this low-permeability barrier are provided in Appendix 7-10. Mr. Alan O. Taylor (Taylor Geo-Engineering, LLC) performed an evaluation of a permanent, low-permeability barrier for Pit 15 (Appendix 7-10). The Taylor Geo-Engineering report indicates that a 50-foot wide barrier built with Tropic Shale derived materials will prevent appreciable drainage of groundwater from the coarse-grained alluvial groundwater system east of the permit area into the backfilled pits. Laboratory analysis of the Tropic Shale material indicates that when compacted, the material should be adequate to keep the alluvial groundwater out of the reclaimed pits. Using this technique, the Applicant should be able to reclaim the pit areas and restore the approximate pre-existing groundwater levels in Sink Valley (Section 728.310 - Potential adverse impacts to the hydrologic balance).

Direct Interception of Regional Ground-water Resources

The Applicant has identified that ground-water resources in the Tropic Shale and Dakota Formation are limited and neither the Tropic Shale nor Dakota Formation is a significant source of ground water. Information supporting this conclusion is found in Section 721. Chapter 6 and Appendix 7-1 contain information on the lithology and stratigraphy of the Tropic and Dakota strata. Bore-hole logs in Appendix 6-4 indicate strata overlying and immediately underlying the Smirl Coal do not possess aquifer characteristics. In the proposed permit and adjacent area, these strata provide no baseflow to streams or water from wells. The Applicant has identified one small spring (SP-4; average flow ~1 gpm) and seeps SP-27 (also known as Clampett Spring) and SP-34 that flow from the Dakota Formation in the area just south of the proposed mine (Drawing 7-1). There are no wells in the proposed permit and adjacent area that produce water from the Tropic Shale or Dakota Formation. Mining of the Smirl Coal, at the Tropic – Dakota interface, is not expected to intercept significant volumes of water from these strata nor adversely impact any aquifer below the coal.

A comment was received that there were no contour maps or cross sections depicting seasonal difference in head for aquifers in the Dakota Formation, that there are no water monitoring wells in the Dakota Formation, and that there is no description of the geology that includes any aquifer below the lowest coal seam to be mined. The commenter did not identify an aquifer in the Dakota strata, and neither the Applicant nor the Division has seen any indication of an aquifer or other significant subsurface water resource in the Dakota or Tropic Shale strata, in

and adjacent to the coal seam to be mined, that would warrant requiring the mentioned maps and cross sections or requiring the Applicant to install monitoring wells in the Dakota Formation.

The Navajo Sandstone aquifer is a regional aquifer that provides ground water of good quality for domestic and agricultural use and to municipal wells. It provides baseflow to springs and streams and is the first water-bearing stratum underlying the Smirl Coal Seam that can produce appreciable quantities of ground water. It is described in Sections 621, 624.100, 728.310.

Diminution of Downgradient Ground-water Resources

The Applicant has identified that neither the Tropic Shale nor Dakota Sandstone are a significant source of ground water. In the proposed permit and adjacent area, the Dakota Sandstone supports flow from one small spring, possibly fault-related, and a few seeps that have no associated water rights.

Draining of Upgradient Ground-water Resources

Based on information from water monitoring wells, including slug tests and a pumping and recovery test of Y-61, and analysis of the geology and hydrology of the proposed permit and adjacent area, the Applicant has concluded that the proposed mine plan is designed to minimize potential diminution of flow from the alluvial springs in the proposed permit and adjacent area.

The Applicant notes that after the pump at Y-61 was stopped at the end of the 28-hour pumping test, spring discharge rates and water levels in alluvial monitoring wells recovered to approximate pre-test levels. Figure 18 in Appendix 7-1 shows the drawdown and recovery response of four (C2-40, C3-40, C4-30, and SS-30) of the 20 observation wells and three springs (SP-20, SP-8, and SP-14). The observation springs were 750 to 1,400 and the wells 1,800 to 4,400 feet from the pumping well. Drawing 7-14 illustrates the drawdown at C2-40 and two other wells, Y-102 and Y-59, which were within 1,000 of Y-61. The Applicant states that drawdowns at more distant wells are too small to show at the scale on Drawing 7-14; contour lines on Figure 17 of Appendix 7-7 show the extent of the measurable drawdown in the observation wells.

The relationship of the alluvial ground-water table to wells and springs in and adjacent to the NW1/4 of Sec 29 is crucial in understanding the PHC of the proposed mining operation. Figure 18 in Appendix 7-1 indicates that during the pump test on Y-61, water levels actually increased at SP-8 and SS-30 and flow increased at C2-40 after 4 hours of pumping..

The 20 April, 2009 deficiency letter included the following:

> ***R645-301-724.500,*** *The Applicant needs to provide a map – or set of maps – illustrating the size and shape of the cone of depression from the pump-drawdown test at Y-61 (Figure 18 in Appendix 7-1 indicates that during the pump test, water levels actually increased at SP-8 and SS-30 and flow increased at C2-40 after 4 hours of pumping).*

In response to this deficiency, the Applicant submitted Figure 17 of Appendix 7-7, which illustrates the size and shape of the cone of depression from this pump-drawdown test.

If inflows to the mine pits become excessive as mining progresses, the Applicant commits to use techniques such as bentonite- or clay-filled cutoff walls to minimize inflows (Section 724.500). Temporary reductions in flow from alluvial aquifers may occur but are likely to be short-lived as backfilling rules (R645-301-553) require that the pits will remain open for only 60 days after mining is completed.

The 20 April, 2009 deficiency letter included the following:

> ***R645-301-731.530,*** *The Applicant must provide information on water replacement for the domestic water supply for the Sorensen Ranch, including a basic description of the current system, how the water supply will be monitored, and how the water supply will be replaced if interrupted, diminished, or contaminated.*
> *•It is not clear if the water replacement well will also be the water-supply for the mine or for water-replacement only. If the latter, the Applicant needs to commit to have the water-replacement well drilled and developed before beginning overburden removal for Pits 13, 14, and 15.*

Water replacement is discussed in Section 727. Long-term diminution of flow will be replaced with water from a well that has not been drilled yet. The Applicant commits to constructing the new water well prior to the beginning overburden removal for pits 13, 14, and 15 (Sections 731.530 State-appropriated Water Supply and 731.800 Water Rights and Replacement). The Applicant has entered into a written agreement with the town of Alton, Utah to transfer the point of diversion for 50 acre-feet of water for use at the Coal Hollow Mine, which the Applicant plans to use to satisfy the water replacement requirements: a copy of the agreement with the town of Alton is in Appendix 7-8. The planned new water well will be constructed on lands currently leased by Alton Coal Development, LLC.

Sorensen Spring (SP-40) is the current domestic water supply for the Sorensen Ranch. This spring is not currently developed to convey water to the ranch house; water from the spring is used directly from the spring. The operation and reclamation water monitoring protocols for this spring are listed in Tables 7-5 and 7-7A. Should the water source be interrupted, diminished, or contaminated, replacement water will be provided from the Applicant's new well (Drawing 5-8C), or providing water from another suitable water replacement source approved by the Division. The Applicant commits to constructing the new water well prior to the beginning overburden removal for pits 13, 14, and 15 (Sections 731.530 State-appropriated Water Supply and 731.800 Water Rights and Replacement).

Acid and Toxic-forming Materials (728.320)

Appendix 6-2 contains information on the acid- and toxic-forming potential of earth materials in the proposed permit and adjacent areas. Appendix 6-1 (confidential binder) has information on the Smirl Coal Seam that is proposed for mining. Geochemical data indicate the potential for AMD and toxic drainage is low. Acid-forming materials do not appear to be present in the proposed permit and adjacent area in amounts that create a concern, as discussed in Section 728.332. The composite neutralization potential of the overburden and underburden is 180 tons per kiloton, which is almost 33 times the acid potential of 5.5 tons per kiloton, indicating a strong likelihood that acid-mine drainage will not be an issue at the Coal Hollow Mine.

Materials with poor quality SAR, elevated selenium or boron concentrations, or poor pH will not be placed in the upper 4 feet of the reclaimed surface (Sec 728.332).

Impacts to Important Water-quality Parameters (728.332)

The Applicant does not anticipate discharge of waters from the Tropic Shale or Dakota sandstone. The plan calls for limiting inflow of alluvial waters into the pits, reducing the potential for contamination, mainly from increased TDS concentrations (Sec 728.332).

In Section 728.333, the Applicant outlines special measures to be taken when mining nears the eastern edge of Pits 13-15, where there is the greatest chance of intercepting large quantities of ground water from the alluvial artesian ground-water system in the NW ¼ of Section 29, T. 5 W., R. 39 S. These measures can minimize the potential for ground-water inflows and deal with them if they occur. Excavation of the alluvial sediments at the eastern edge of the permit will proceed incrementally and with caution. If coarse, water-bearing alluvial sediments are encountered, the equipment operators will stop overburden removal and cover the exposed gravels with available impermeable alluvial material (Tropic Shale) to, if possible, halt ground-water inflow. A hydrogeologist will be called to the site to assess the conditions. Prior to the resumption of overburden removal, the Applicant will develop a suitable work plan, designed to minimize the potential for intercepting unacceptably large inflows of ground water into the mine pits. The work plan may include such measures as trenching and emplacement of a low-permeability cut-off wall to isolate the mine openings from the coarse-grained alluvial ground-water system, with the object of minimizing the potential for detrimental impacts to the hydrologic balance and the potential for flooding of mine pits and causing flooding or stream alteration thought the discharge of large volumes of water.

As a temporary measure, intercepted alluvial ground waters would be routed into Pond 4, which has a storage capacity of 7.5 acre-ft, 1.8 acre-ft more than required and an emergency

discharge structure (Section 728.333). Design parameters for Pond 4 are in Appendix 5.2. Further details of these special measures are provided in Appendix 7-9, Alluvial Water Contingency Plan.

The Applicant anticipates that water will not be discharged from the mine pits. Water in mine pits interferes with the surface mining technique, so keeping water out of the pits is a priority of mine operation. The only likely, foreseeable source of appreciable quantities of ground water is from the alluvial ground-water systems overlying the Tropic Shale. Where possible, ground water encountered in alluvial sediments along the margins of mine pit areas will, as a temporary measure, be intercepted, drained through pipes, ditches or other conveyance methods away from mining areas (Section 728.332).

Sedimentation ponds and other sediment control methods will minimize erosion from disturbed areas and control or prevent additional contributions of suspended solids to stream flow or runoff outside the permit area.

The Applicant commits to using spill control kits on all equipment to minimize contamination from spillage of hydrocarbons, and that the site will have a SPCC plan (Section 728.322).

The Applicant states that as ground water migrates through the shallow, fine-grained alluvial sediments in the proposed Coal Hollow Mine permit and adjacent area (most notably in Sink Valley), the quality of the water is naturally degraded: Appendix 7-1 is referenced for this information. Drawing 7-5 shows that specific conductance of the water increases downgradient. Stiff diagrams for selected springs, shown on Figure 14 of Appendix 7-1, indicate a downgradient evolution from calcium-magnesium-bicarbonate type waters toward waters with greater portions of sodium, potassium, magnesium, and sulfate and increased TDS.

The application states that pumping and discharging of mine water from mine pits at the proposed Coal Hollow Mine permit area is not anticipated (Section 728.332). The Applicant does not anticipate water entering the pit from adjacent strata, but the application includes a contingency plan to minimize or eliminate such inflows should this occur (Appendix 7-9). If excessive quantities of water, from any source, were to flow into the pits, the Applicant commits that water is to be pumped from the pits using suitable equipment kept on-site, and managed in compliance with applicable State and federal regulations. The Applicant emphasizes that flooding of the pit would hinder mine operations and it will be in their best interest to take all reasonable efforts to minimize the potential for flooding of the mine pits (Section 728.333).

Flooding or Streamflow Alteration (728.333)

The Applicant asserts in Section 728.333 that the reasonably foreseeable mine discharge of several hundred gpm and the maximum anticipated alluvial ground-water discharge to Sink

Valley Wash or Lower Robinson Creek are much less than the flows occurring periodically in those drainages during torrential precipitation events, and will likely not be sufficient to potentially cause flooding or stream flow alteration in either drainage. The addition of modest amounts of sediment-free water into these stream channels has the potential to cause minor increases in channel erosion; however, the magnitude of this potential impact will likely be small relative to the erosion and sedimentation occurring during torrential precipitation events.

The 20 April, 2009 deficiency letter included the following:

> ***R645-301-728 and –121.200,*** *Sections 724.500 and 728.310, p. 7-31 state that backfilling and individual mine pits in will remain open for no more than 60 to 120 days, but it is not clear whether this timeframe is 60 – 120 days post mining or whether the timeframe includes both mining and reclamation. The Application should be more specific in Sections 724.500 and 728.310 concerning the length of time that a pit may remain open during coal recovery through completion of backfilling.*

Based on the estimated mine pit ground-water inflow rates in Table 7-9, the Applicant considers it likely that mine interception will be on the order of a few tens of gpm (dry areas; small pit size) to several hundred gpm (wetter areas; large pit size). Individual mine pits will remain open for no more than 60 to 120 days, minimizing inflow (Sections 724.500, 728.310, and 728.334). The Applicant has added that the 60 to 120 days are to be measured from the time the mining of the pit is completed to the time the pit is backfilled.

The Applicant states in Section 728.333 that lower Sink Valley Wash (below the County Road 136 crossing), Lower Robinson Creek, and Kanab Creek have large discharge capacities and periodically convey large volumes of runoff: The Division's database contains flow data from these streams back to 1987. The data show that, although Kanab Creek, Sink Valley Wash, and Robinson Creek are typically dry, flows of several hundred gpm - and on occasion thousands of gpm - occur periodically. The maximum flow reported for Kanab Creek is 6,283 (14 cfs) at SW-2 (above the confluence with Lower Robinson Creek) on 2/11/1988; a more recent high flow of 4,170 gpm (9 cfs) occurred on Kanab Creek at SW-3 (below the confluence with Lower Robinson Creek) on 03/22/2008.

The Applicant finds it noteworthy that the principle surface drainages in and adjacent to the proposed Coal Hollow Mine permit area, i.e., Lower Robinson and Kanab Creeks and their tributaries, are in many locations not stable in their current configurations, and are actively eroding their channels during precipitation events. This results in down-cutting and entrenchment of stream channels, the formation of unstable near-vertical erosional escarpments adjacent to stream channels that occasionally spall off into the stream channel, aggressive headward erosion of stream channels and side tributaries, and the transport of large quantities of sediment associated with torrential precipitation events. These processes appear to be migrating upstream, resulting in increasing lengths of unstable stream channels. The Applicant cites researchers who propose that although the creation of the numerous arroyos currently in

existence in the southwestem United States is not completely understood, the effect may have been magnified by the temporal coincidence of several factors: 1) valley fill alluviation in the southern Colorado Plateau occurred during a long-term decrease in the frequency of large, destructive floods, which ended in about 1880 with the beginning of the historic arroyo cutting; 2) the shift from deposition to valley entrenchment coincided with the beginning of an episode of the largest floods in the preceding 400-500 years, which was probably caused by an increased recurrence and intensity of flood-producing El Nino Southern Oscillation events beginning around 1870; 3) land-use practices such as livestock grazing, and 4) natural cycles of erosion and deposition caused by internal adjustments to the channel system. The Applicant cites historical evidence that the cutting of Kanab Creek began with a large storm on 29 July 1883, followed by unusually large amounts of precipitation in 1884-85, and that during this period, the Kanab Creek channel was down-cut by 60 feet and widened by 70 feet over a distance of about 15 miles: the lowering of Kanab Creek may have resulted in a lowering of the local base level and consequent incision of both Sink Valley Wash and Lower Robinson Creek. Heavy livestock grazing likely contributed to the stream down-cutting episode in the late 1800s. The Applicant proposes that the Coal Hollow Mine MRP is designed to minimize the potential for sediment yield and erosion and consequently for stream channel erosion and instability; no mining-related activities are planned that would likely increase current instability of the surface water drainages in the permit and adjacent area (Section 728.333).

The application states in Section 728.333 that most precipitation runoff on disturbed areas will be contained in diversion ditches and routed to sedimentation impoundments. Sediment control facilities will be geotechnically stable, minimizing the potential for breaches, which can result in down-stream flooding and increased erosion and sediment yield. Emergency spillways will provide a non-destructive discharge route from the impoundments, if needed.

In the proposed mining plan, Lower Robinson Creek is to be diverted temporarily. Appendix 5-3, prepared by Dr. James E. Nelson, Assistant Professor, Civil and Environmental Engineering at BYU, contains the analysis and specifications for this diversion, and Drawings 5-20 through 5-21A show design details for the construction and reclamation of this channel. The resulting temporary channel will have straight reaches and three sharp bends - including two 90° bends - and will require extensive rip-rap. The reclaimed channel will be in approximately the same location as the current channel; however, instead of restoring the channel to its current configuration, with an entrenched channel and steep embankments, the Applicant proposes a sinuous channel, flanked by a narrow flood plain, with banks laid back at a more gentle angle.

Ground Water and Surface Water Availability (728.334)

Water rights are shown on Drawing 7-3 and listed in Appendix 7-3, and corresponding spring IDs are shown on Drawing 7-2. Domestic water for the Swapp and Sorenson Ranches comes from alluvial springs. Spring SP-8 (water right 85-353) supplies the Swapp Ranch, but the water right doesn't designate domestic use. Sorensen's water right 85-373 (SP-40) is for

both stockwatering and domestic use. Pugh's water right 85-215 (SP-23) is located right along the fence between Pugh's and Dame's properties and is the only domestic water right within the proposed permit area. Spring SP-33 (water right 85-1011), south of the proposed permit area, supplies domestic water for the Johnson family.

Alluvial springs have provided limited irrigation water for home gardens and fruit trees in areas adjacent to the proposed Coal Hollow Mine permit area (Drawing 7-7), but other than some current yard irrigation at the Swapp Ranch house, these lands have not been irrigated for over 10 years (Personal communication, Burton Pugh, 2008; Richard Dame, 2007). The.Pughs and Dames own both the coal that will be mined and the overlying surface, as shown on Drawings 1-3 and 1-4.

Mr. Sorensen has used runoff from the adjacent Paunsaugunt Plateau for flood irrigation for hay or grain on lands east of the proposed Coal Hollow permit area (Chapter 4, Exhibit 4-1 and Drawings 1-3, 1-5, 1-6, and 3-1). Based on personal communication between Mr. Sorensen and the Applicant, this irrigation typically has been a single application in the spring and is largely limited to years with appreciable precipitation and stream runoff: with the exception of 2005, water has not been sufficient for flood irrigation in recent years. Source areas for these waters are topographically and stratigraphically upgradient of and distant from the proposed Coal Hollow Mine, and surface- and ground waters from these areas will not be impacted by the proposed mining activities (Section 721; Appendix 7-7, Section 4.1).

The Applicant estimates State appropriated water supplies to be approximately 35 gpm in Alluvial Groundwater Discharge Area A and 17 gpm in Area B (Section 727; Drawing 7-4; Appendix 7-3), so in a worst-case scenario, the Applicant would be required to replace approximately 52 gpm of state appropriated water rights. The Applicant states that the proposed water well in Section 29, T. 39 S., R. 5 W. will be designed to produce water sufficient to meet that demand, and further that the aquifer analysis in Appendix 7-1 suggests that the yield of the alluvial ground-water system should be capable of sustaining discharges of the duration and volume likely needed to replace the water. The Applicant notes that the likely duration will be relatively short (Section 728).

The 20 April, 2009 deficiency letter included the following:

> ***R645-301-728.334,*** *Under Direct Interception of Groundwater Resources, the Applicant states that:*
>
> > *"Alluvial groundwater systems in planned mining areas in the proposed Coal Hollow Mine permit area will be directly intercepted by the mine openings. It is not anticipated that the direct interception of shallow alluvial groundwater will adversely impact the overall hydrologic balance in the region. This is because no springs, seeps or other important groundwater resources have been identified in proposed mine pit areas (Drawing 7-1). In the pre-mining*

> *condition, any diffuse groundwater discharge to the ground surface that occurs is primarily lost to evapotranspiration and does not contribute appreciably to the overall hydrologic balance in the area."*
>
> *This addresses ground water that supplies springs and seeps but seems to ignore the importance of subirrigation to what is possibly an adjacent AVF and dismisses the impact that direct interception of ground water in the alluvial aquifer would have on the moisture held in the soils and the essential hydrologic function of the potential AVF. The Applicant needs to address the possible impacts of interception of the alluvial aquifer on subirrigation and soil moisture in the adjacent, potential AVF.*

Since writing this deficiency, the Division has concluded that the proposed permit area and adjacent area do not contain an AVF. The Applicant has modified one sentence in the statement to read, "This is because no substantial springs, seeps or other important groundwater resources have been identified in proposed mine pit areas (Drawing 7-1)."

The Applicant has addressed the potential for short-term impacts to subirrigation and soil moisture in the land upgradient of proposed mining areas. These potential short-term impacts will be minimized through implementation of the hydrology resource contingency plan described in Appendix 7-9. (Section 728.310 - Potential adverse impacts to the hydrologic balance, Direct Interception of Groundwater Resources).

Mr. Alan O. Taylor (Taylor Geo-Engineering, LLC) performed an evaluation of a permanent, low-permeability barrier for Pit 15 (Appendix 7-10). The Taylor Geo-Engineering report indicates that a 50-foot wide barrier built with Tropic Shale derived materials will prevent appreciable drainage of groundwater from the coarse-grained alluvial groundwater system east of the permit area into the backfilled pits. Laboratory analysis of the Tropic Shale material indicates that the when compacted the material should be adequate to retain the alluvial groundwater. Using this technique, the Applicant should be able to reclaim the pit areas and restore the approximate pre-existing groundwater levels in Sink Valley (Section 728.310 - Potential adverse impacts to the hydrologic balance, Draining of up-gradient groundwater resources).

Water replacement is discussed in Section 727. Long-term diminution of flow will be replaced with water from a well that has not been drilled yet. The Applicant commits to constructing the new water well prior to the beginning overburden removal for pits 13, 14, and 15 (Sections 731.530 State-appropriated Water Supply and 731.800 Water Rights and Replacement). The Applicant has entered into a written agreement with the town of Alton, Utah to transfer the point of diversion for 50 acre-feet of water for use at the Coal Hollow Mine, which the Applicant plans to use to satisfy the water replacement requirements: a copy of the agreement with the town of Alton is in Appendix 7-8. The planned new water well will be constructed on lands currently leased by Alton Coal Development, LLC.

The Applicant concludes that there is essentially no probability that surface water in the Sink Valley Wash drainage could become unavailable as a result of the proposed mining and

reclamation activities: the surface waters originate from up-gradient areas that are located large distances from the proposed mining, and the stream channels are entirely outside the area to be disturbed by mining and reclamation activities. The application states that in the Sink Valley Wash drainage, surface-water from Swapp Hollow and diverted from Water Canyon is used for stock watering and limited irrigation (Section 728.334). Drawing 7-3 shows there are water rights for surface point-of-diversion and point-to-point diversions along Sink Valley Wash but none in the two mentioned tributary drainages (monitoring at point SW-8 in Swapp Hollow has consistently noted flow in this channel). Even though Drawing 7-3 shows point-to-point and surface point-of-diversion water rights in Sink Valley Wash below Section 29 T. 39 S., R. 5 W., the application states that below Section 29, Sink Valley Wash usually has no appreciable discharge.

The application indicates Lower Robinson Creek immediately above the proposed permit area typically discharges only in direct response to precipitation or snowmelt, so surface-water availability is limited (Section 728.334). Ground water seeps from the alluvium into the deeply incised stream channel near the exposed Dakota-alluvium contact in the bottom of the stream channel, in the SE¼, Section 19, T. 39 S., R. 5 W. This seepage, monitored at SW-5 (Drawing 7-2), is characterized as usually 5 - 10 gpm or less: significantly larger flows, as great as 410 gpm, have been reported at this site (Division's database), although such large flows are presumed to be runoff – the database does not distinguish seepage from runoff.

Surface-Water Monitoring Plan

The 20 April, 2009 deficiency letter included the following:

R645-301-724.200, and - 121.200,

- *The surface-water baseline discrepancies between Section 724.200, Drawing 7-2, Table 7-5, and the Division's database, as outlined in the following table, still need to be resolved. BLM-1 is on Drawing 7-10, but the Applicant needs to include it on Drawing 7-2, which shows baseline monitoring points.*
- *The Applicant stated in the cover letter for the December 2008 submittal that "Surface-water baseline monitoring sites SW-I0, BLM-l, and Lamb Canal were added to the description in Section 724.200", but no such information has been added to that section of the application. The Applicant must clarify this.*

Baseline Monitoring Sites	*Described in Section 724.200*	*Listed in Table 7-5*	*Shown on Drawing 7-2*	*Data in Database*
SW-1	√		√	√
SW-7	√		√	√
SW-10			√	√
BLM-1	√	√	*(Drawing 7-10)*	√
Lamb Canal			√	√

The protocol for baseline and operational surface-water monitoring is in Tables 7-4 through 7-6B of the MRP. Drawing 7-2 shows all baseline monitoring locations, and Drawing 7-10 shows all operational monitoring sites. Section 724.200 discusses baseline surface-water monitoring; three paragraphs at the end of Section 724.200 describe specific baseline surface-water monitoring sites, including SW-I0, BLM-l, and Lamb Canal. [As shown on Drawing 7-2, SW-18 is on an ephemeral wash located over a mile outside the permit area, and the Applicant has not observed any discharge at SW-18 during monitoring (Erik Peterson, personal communication). Baseline data for SW-18 have not been entered into the Division's database.]

The 20 April, 2009 deficiency letter included the following:

> ***R645-301-727,*** *Sections 728.310, (Draining of up-gradient groundwater resources, p. 7-29) and 728.334 (p. 7-44) still refer to Y-61 as a water production well: the Applicant needs to clarify the proposed purpose of Y-61.*

The Applicant changed the text on these two pages to describe Y-61 as an "alluvial testing production well".

R645-301-724.200 and -121.200).

The Applicant has received a UPDES permit to discharge from the mine pit, to either Lower Robinson Creek or Sink Valley Wash, which are both tributary to Kanab Creek.

Findings:

Hydrologic Resource Information is sufficient to meet the requirements of the Coal Mining Rules.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

Subsurface Water Resource Maps

Ground-water resources consist of both springs and wells. Artesian conditions have been documented in several wells, and some have sufficient head to flow. Drawing 7-13 shows the potentiometric or water-table elevations of the alluvial ground-water system. This is

somewhat deceptive because it does not relate ground water to the surface topography, i.e., it gives the impression of a fairly uniform subsurface water table, whereas the data show springs and seeps, flowing wells, and areas of confined and unconfined conditions, and two areas where ground water flows to the surface. Figure 13 of Appendix 7-7 has been added to show the potentiometric elevations in relation to the surface elevation.

The 20 April, 2009 deficiency letter included the following:

> ***R645-301-722.100 and -121.200,*** *Section 722.100 contains the statements that, "...It is important to note that the alluvial ground-water potentiometric contours depicted in Drawing 7-2 are not representative of a laterally or vertically continuous ground-water system..." Drawing 7-2 does not contain potentiometric data; Drawing 7-13 and Figure 13 of Appendix 7-7 contain this information; however, Drawing 7-13 has contours but no potentiometric data values, while Figure 13 has potentiometric data values but no contours. Both data and contours need to be shown on the same map.*
>
> - *The Applicant needs to add contour lines to Figure 13 of Appendix 7-7 and*
> - *Potentiometric data to Drawing 7-13.*
> - *The erroneous references to Drawing 7-2 need to be corrected.*
>
> ***R645-301-722.100,*** *Drawing 14 of Appendix 7-7 shows the seasonal variation of head during 2007, but the values have not been contoured.*
>
> - *The Applicant needs to add contour lines to Figure 14 of Appendix 7-7.*
> - *Also, although the numbers imply the water levels rose between June and December, the Applicant needs to clarify this.*

The Applicant adequately addressed these deficiencies in their August 27 submittal. Drawing 7-13 shows both the potentiometric values and potentiometric surface contour lines, and Figure 7-13 of Appendix 7-7 shows both the elevations of the groundwater relative to ground level and corresponding contour lines. Contour lines have been added to the Seasonal Variation data on Figure 7-14 of Appendix 7-7.

Cross sections on Figures 6b through 6g in Appendix 7-7 show water-level variations in the Alluvial Groundwater Systems between June and November -December 2007 at selected wells. Figure 14 of Appendix 7-7 maps the seasonal variation of head during 2007, the values representing the difference between the maximum and minimum water level measured for each well during 2007: water levels in most wells declined from springtime to fall, but water levels in some wells increased during the late fall, perhaps in response to the seasonal decrease in the evapotranspiration rate. For specific information for each well, see Figure 3 and Table 1 of Appendix 7-7.

The 20 April, 2009 deficiency letter included the following:

> *Spring locations on Drawings 7-1, 7-2, and 7-10 do not match those on Drawing 7-3. The Applicant must resolve this confusion.*

The Applicant eliminated the confusion by changing the spring water-right designations on Drawing 7-3. The identification is now a combination of the Reference Number from Appendix 7-3, Exhibit 7-3 and the water right number associated with each spring, e.g., WRS-6/85-352).

Findings:

Maps, Plans and Cross Sections of Resource Information are sufficient to meet the requirements of the Coal Mining Rules.

OPERATION PLAN

The Division received a comment that the Operation Plan is not specific to local hydrologic conditions nor does it address potentially adverse hydrologic consequences because the PHC is not complete. As discussed in this and other Tech Reviews, there remain elements in the data and MRP that are not perfect, but these are not fatal flaws that have precluded the Applicant from formulating an Operation Plan. The Operation Plan submitted by the Applicant is based on valid baseline data and a reasonable PHC determination; these are subject to updating whenever additional information becomes available

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

General

The 20 April, 2009 deficiency letter included the following:

> ***R645-301-731,*** *The Applicant must provide a design for the margin where the pits meet the undisturbed alluvium that specifies methods to be used to minimize drainage from the alluvium into the fill in the reclaimed pits (as the pits are filled and reclaimed). In the cover letter for the December 2008 submittal, the Applicant states that this has been addressed, but the information could not be found in Chapters 5 or 7.*

The eastern edge of the pits will intercept alluvial aquifers that support numerous springs, wells, and subirrigated lands. There is probably going to be drainage from these aquifers into the pits; being most probable when the Tropic Shale Ridge is breached during the development and mining of Pits 13, 13, and 15. When mining is done in each pit, it is to be filled and reclaimed. Porous fill material must not be left adjacent to the alluvial aquifers because that would facilitate continuous drainage from the aquifers into the fill in the pits. A grout curtain or geomembrane would be possible methods of blocking ground-water flow across this boundary, but the Applicant may devise other methods to achieve this purpose. In Appendix 7-9 and 7-10, the Applicant has described a contingency plan do deal with inflows of 1 cfs or greater from the east edge of the excavations.

To minimize the potential for long-term impacts to the alluvial groundwater system in Sink Valley up-gradient of mining areas that could occur as a result of the long-term draining of alluvial groundwater into the pit backfill area, a permanent, engineered low-permeability barrier will be emplaced adjacent to the undisturbed alluvial sediments along the eastern edge of the Pit 15 disturbance area. Information and design details are in Appendix 7-10 (Sec. 728.310 - Potential adverse impacts to the hydrologic balance, Direct Interception of Groundwater Resources).

Diversions: Perennial and Intermittent Streams

There are no perennial or intermittent streams in the proposed permit or adjacent areas.

Diversions: Miscellaneous Flows

Drawings 5-20 and 5-21 show plans for the Robinson Creek diversion. This is planned to be a temporary diversion. Details of the proposed diversion are given in Chapter 5, Section 527.220

Diversion of other miscellaneous flows is planned using four diversion ditches. Two will be primarily used to route runoff from upland, undisturbed areas away from the planned disturbed areas, and the other two are planned to direct runoff from disturbed areas into sediment impoundments. Drawings 5-27, 5-33 and 5-34 show the locations of these diversions, along with the associated watersheds. Appendix 7-2 contains the calculations related to these diversions.

Stream Buffer Zones

The Applicant commits that any perennial or intermittent stream (which included ephemeral streams that drained a watershed of at least one square mile under the Coal Mining Rules in effect at the time this plan was first submitted, i.e., Lower Robinson Creek) in the mine area will be protected by 100 foot stream buffer zones on either side. Areas surrounding the

streams that are not to be disturbed will be designated as buffer zones and will be marked as specified in R645-301-521.260 (731.600).

In order to allow any proposed operations inside a stream buffer zone, the Division must find that that the coal mining and reclamation operations will not cause or contribute to the violation of applicable Utah or federal water standards and will not adversely affect the water quality and quantity or other environmental resources of the stream.

Lower Robinson Creek is the only stream in or adjacent to the proposed permit area to which the Buffer Zone rules might apply. As currently proposed, the plan calls for the temporary diversion of a reach of Lower Robinson Creek, approximately 2,000 feet in length, in the SE/4 of Section 19, T. 39 S., R. 5 W. Details of the proposed diversion are given in Chapter 5, Section 527.220 of the MRP.

Other mine disturbances within 100 feet of Lower Robinson Creek include the Loadout Facility, the Main Haul Road where it crosses the creek, Diversion Ditches 2 and 4, and the Excess Spoil Pile (Drawings 5-3, 5-4 and 5-22). No spoil will be placed as valley fill in Lower Robinson Creek (Section 535.200).

Runoff and sediment control measures are detailed in Chapter 5 and Appendix 5-2. Berms or diversion ditches will capture and control runoff from roads and other active mining and reclamation areas and divert the waters to sedimentation ponds. Sedimentation ponds are designed to provide total retention for a 100-year, 24-hour storm event (Section 733.100). In areas where sedimentation ponds or diversions are not suitable, silt fence or straw bales will be utilized to control sediment discharge (Section 731, Groundwater and Surface-Water Protection).

The Applicant has a General UPDES permit that allows discharge of water from the mine; outfalls have not been designated yet, but Lower Robinson Creek and Sink Valley Wash will be the receiving streams (Section 724.200). Discharges complying with this UPDES permit will be in compliance with federal and State water quality standards and should have no adverse affects to the water quality and quantity and other environmental resources of the stream.

There are no proximate downstream uses or water rights. Pre-mining baseline water quality and quantity data are in the Division's database.

The Division finds that the planned coal-mining and reclamation operations within 100 feet of Lower Robinson Creek will not cause or contribute to the violation of applicable Utah or federal water quality standards and will not adversely affect the water quantity and quality or other environmental resources of Lower Robinson Creek. The Division therefore authorizes the Permittee to conduct the planned coal-mining and reclamation activities within 100 feet of Lower Robinson Creek.

The 20 April, 2009 deficiency letter included the following:

> ***R645-301-742.313 and -553.110,*** *As currently proposed, the plan calls for the temporary diversion of a reach of the Lower Robinson Creek stream channel in the southeast 1/4 of Section 19, T. 39 S., R. 5 W. Details of the proposed diversion are given in Chapter 5, Section 527.220 of the MRP. Statements on pp. 7-19, 7-28, 7-46, and 7-57 in the MRP refer to this as a permanent diversion; the Applicant needs to remove these statements or correct them to indicate that this will be a temporary diversion.*

These statements have been corrected and now read "temporary diversion"

Water Replacement

Water replacement is discussed in Section 727. Long-term diminution of flow will be replaced with water from a well that has not been drilled yet. The Applicant commits to constructing the new water well prior to the beginning overburden removal for pits 13, 14, and 15 (Sections 731.530 State-appropriated Water Supply and 731.800 Water Rights and Replacement). The Applicant has entered into an agreement with the town of Alton to transfer a point of diversion for water rights to 50 acre-feet of water, which the Applicant plans to use to satisfy the water replacement requirements: a copy of the agreement is in Appendix 7-8. The planned new water well will be constructed on lands currently leased by Alton Coal Development, LLC.

Findings:

Hydrologic Information is sufficient to meet the requirements of the Coal Mining Rules.

RECLAMATION PLAN

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

Analysis:

Hydrologic Reclamation Plan

The 20 April, 2009 deficiency letter included the following:

R645-301-731.214, *Hydrologic monitoring during reclamation can be assumed to be the same as during mine operation, but the Applicant needs to clarify the reclamation water monitoring plan.*

The hydrologic monitoring plan is described in Section 731.200 of Chapter 7 (and also Section 12.0 of Appendix 7-1). Hydrologic monitoring protocols, sampling frequencies, and sampling sites are described in Table 7-4. Groundwater and surface-water monitoring locations are listed in Table 7-5. Operational field and laboratory hydrologic monitoring parameters for surface water are listed in Table 7-6, and for groundwater in Table 7-7 of Chapter 7. These Tables apply to both mine operation and reclamation

The Applicant commits in Section 763.100 that siltation structures will be maintained until removal is authorized by the Division and the disturbed area has been stabilized and revegetated. In no case will the structure be removed sooner than two years after the last augmented seeding. All impoundments will be reclaimed at the end of operations. The estimated timeline for removal of impoundments is shown on Drawing 5-38, with expected removal in year four of the reclamation process (Section 533.700 - 714. Plans). In areas where soils require stabilization following the removal of these sediment impoundments, silt fence will be appropriately installed and maintained to provide sediment control until stable conditions are met (Section 763.100). When the siltation structure is removed, the land on which the siltation structure was located will be regraded and revegetated in accordance with the reclamation plan (Section 763.200).

Lower Robinson Creek will be reconstructed to its approximate original location. The design for this reconstruction is shown on Drawings 5-20A and 5-21A. This design includes considerable improvements to the channel compared to the channel's current condition, which is such that less than 25% of the channel within the disturbed area has a flood plain present, and most of the slopes are near the angle of repose and have only fair to poor vegetative cover. The reconstructed channel includes stable slope angles that will be revegetated, with a flood plain on both sides of the channel for the entire reconstructed length. The reconstructed channel will be sinuous, and rip-rap will be installed in the bottom of the channel to minimize erosion. The flood plain will seeded and covered with erosion matting to control erosion until a natural vegetative condition can be attained (Section 742.323).

The Applicant commits in Sections 529, 748, 755, and 765 that, when no longer needed for monitoring or other use approved by the Division upon a finding of no adverse environmental or health and safety effects, or unless approved for transfer as a water well under R645-301-731.100 through R645-301-731.522 and R645-301-731.800, each well will be capped, sealed, backfilled, or otherwise properly managed, as required by the Division in accordance with R645-301-529.400, R645-301-631.100, and R645-301-748. Permanent closure measures will be designed to prevent access to the mine workings by people, livestock, fish and wildlife, machinery and to keep acid or other toxic drainage from entering ground or surface waters.

If a water well is exposed by coal mining and reclamation operations, it will be permanently closed unless otherwise managed in a manner approved by the Division. Permanent closure and abandonment of water wells greater than 30 feet in depth will be in accordance with the requirements of "Administrative Rules for Water Well Drillers" (State of Utah Division of Water Rights) or other applicable state regulations, or by using a different procedure upon approval from the Utah State Engineer (Sections 529, 745, 755, and765).

Findings:

Information on the Hydrologic Reclamation Plan is adequate to meet the requirements of the Coal Mining Rules.

RECOMMENDATIONS:

The application can be approved.

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